

# LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

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## ADDITIONAL SPECIES OF ELAEOCARPUS

By

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In article thirty five of this publication, *Dr. Aug. de Candolle* listed sixteen species and a few doubtful ones in his revision of our then known Philippine *Elaeocarpus*. Since that time new collections from the southern Philippines brought together many new additional ones, so that at the present time we know toward forty species in our archipelago.

The largest increase came in the collection made in the vicinity of mount Apo. In that great forested basin of the king of Philippine mountains, are extraordinary large trees with trunks five feet in diameter and reach a height of seventy five feet to the first limbs. The wood of most of our big tree species at middle elevations is moderately soft and light, very easily worked. The color is white with a slight tinge of yellow. Some of our low stocky trees in alpine regions have harder and whiter woods, while that of *E. foxworthyi* Merr. is fairly heavy, burly and reddish.

The ripe fruits are characteristic, the *Elaeocarpus* nut is always known by the corrugated stone seed. Most fruits of our Philippine species are covered by a smooth and shining coeruleus or aeruginously colored skin. *E. nervosus* Elm. and *E. gigantifolius* Elm. have smooth ruber red to purple fruits. That of *E. versicolor* Elm. is citrinus, although after lying on the ground and while the skin becomes soft, the color changes to incarnatus. The receptacles of many of our fig species undergo similar changes in color and texture. The fruits of *E. foxworthyi* Merr. and *E. minda-*

*naensis* by the same author are provided with a fuzzy fulvus or umber brown covering. The kernel of most species is rich in oil and very palatable.

The yellowish white flowers of *Elaeocarpus* species are rather of a dainty sort, occasionally naked but usually clothed with silvery or fulvous hairs. Some have a distinct pendant habit. Most of them are odorless, yet a few possess a honey fragrance. The persistent calyx frequently becomes reddish tinged when old. The ciliate to fimbriate or even laciniate petals prove a splendid character by which the genus can be recognized. The glabrous or silky pistil is surrounded at the base of the ovary by a series or ring of light yellow glands. When some of our floriferous tree species are in full flower they can be singled out of the forest mass at long distances.

#### ***Elaeocarpus venosus* C. B. Rob.**

A very characteristic species from the Mountain province (including Benguet and Lepanto), Luzon. Through an oversight it was omitted in *Dr. Aug. de Candolle's* revision.

#### ***Elaeocarpus foxworthyi* Merr.**

A medium sized tree; stem 2.5 feet thick, 35 to 45 feet high, quite crooked, terete except the wadded base, its main branches widely spreading from the middle; branchlets rather slender and spreading, tips suberect; wood moderately hard and burly, odorless, nearly tasteless, quite heavy, the sapwood white, otherwise deeply tinged with red; bark thick, reddish brown except the mottled smooth epidermis; leaves horizontal, parchment-like, the sides usually curved upon the paler lower surface, the midvein and the lateral nerves beneath testaceous brown as is also the petiole. Spikes divaricate, chiefly along the branchlets, 1 to 1.5 dm. long, densely rufous tomentose; pedicels stout, nearly 1 cm. long, densely ferruginous pubescent; calyx rigid, stellately spreading, the basal portion united; segments latericius hairy on the outside, 7 mm. long, 3 mm. wide toward the base, glabrous on the inner side and with a quite prominent midvein, yellowish green, ovately oblong, 5; petals free, of the same number, quite rigid, well spreading out, glabrous on both sides, flat, sulphureous, strongly nerved,

a trifle exceeding the sepals, 5 mm. wide above the middle, the upper one third divided into unequal setaceous and castaneous colored segments, inserted about the base of the disk; hypogenous rim densely hairy, rugose, yellowish; stamens toward 20, erect from the glandular disk; filaments nearly 1 mm. long, subglabrous; anthers 2 to 3 mm. long, linear, subterete, subscabrous, longitudinally ridged, split at the apex into 2 very short equal lobes, 0.33 mm. thick, dehiscing terminally; ovary broadly conical, densely hairy, gradually tapering into the pubescent style scarcely longer than itself, toward the united apex glabrous. Fruits pendant, latericius fuzzy, short ellipsoid or subglobose, 3.75 cm. across, exocarp green and dry; stony seed large, brown and shallowly rugose.

Represented by number 12739, *Elmer*, Puerto Princesa (Mt. Pulgar), Palawan, March, 1911.

Here and there scattered in woods of shallow fertile soil with a gravelly subsoil at 250 feet altitude. The flowers, fruits and wood specimen were taken from the same tree, and our fruiting specimens are exactly like *Merrill's* type number.

***Elaeocarpus cuernosensis* Elm. n. sp.**

A low scrubby tree; branchlets smooth, terete, flexible, the leaf bearing portion ascending; twigs slightly strigose but soon becoming glabrous. Leaves very numerous, ascending, chartaceous, deep green especially the upper side, dull brown when dry, somewhat folded above especially toward the strongly recurved acuminate tips, in the young state densely pubescent at least beneath, when old glabrate, the average blades 6 cm. long by 3 cm. wide across the middle, alternately scattered along the branchlets, base obtuse, margins finely dentately serrate except near the base, elliptish; nerves 4 to 6 pairs, very oblique, only slightly curved, nearly as prominent as the midvein, tips anastomosing, with hairy glands in their axils, reticulations very fine and quite evident, all more or less softly strigose along the nerves beneath; petiole less than 1 cm. long, striate on the upper side, subolivaceous strigose but soon wearing glabrous; bud bracts acuminate, sericeous. In frutescent spike suberect, not exceeding 5 cm., subglabrous, from the lowermost leaf axils; fruits alternately scattered especially toward the apex, ovoidly ellipsoid, shining, glabrous

when old, 9 mm. long, 6 mm. thick below the middle, deep aeruginous when mature, its stone-like seed finely rugose; pedicel strict, nearly as long as the fruit.

Type specimen 9653, A. D. E. Elmer, Dumaguete (Cuernos Mts.), Province of Negros Oriental, Negros, March, 1908.

Discovered along the trail on a mossy ridge at 5000 feet and formed one of the many kinds of low stocky trees or interlaced shrubs.

Distributed under *E. mastersii* King. As to our Philippine *Elaeocarpus* it is nearest to *E. merrittii* Merr. but leaves more elliptic, not ovately so, acute to obtuse at base, not rounded; petioles not so slender nor infrutescence as long and with apparent smaller fruits. The prominent axillary glands on Merrill's specimen are minute or nearly obsolete in ours.

### ***Elaeocarpus fusicarpus* Elm. n. sp.**

Small erect tree, 10 m. high, with a 1.5 dm. thick stem; branches lax and numerous, terete, widely spreading, the young twig portion isabellinus pubescent but very soon glabrous; bark grayish mottled, lenticelled, thin, the inner surface yellowish green; wood delicately white, soft, light, odorless and tasteless. Leaves ovately oblong, ample, alternately scattered along the branchlets, membranous, conduplicately recurved, lucid and deeper green on the upper side, duller beneath, the two sides very unequal brown when dry, glabrous above, finely pubescent beneath especially along the nerves, obscurely crenately serrate, the larger blades 9 cm. long by 4 cm. wide across the middle or below it, frequently much smaller, gradually tapering to the acute to acuminate apex, base broadly rounded; petiole scarcely exceeding 5 mm., finely cinereous, flattened along the upper side; midvein pronounced, hairy, lateral pairs 4 to 6, ascendingly curved, tips anastomosing, also pubescent, the hairy axillary glands nearly obsolete, reticulations obscure. Floral spikes suberect, chiefly from the upper leaf axils, slender, softly covered with isabellinus hairs, 5 to 8 cm. long; flowers alternately scattered above the middle mainly, slightly odorous, pendulous; bracts subtending the pedicels linear to oblongish, 5 mm. long, softly pubescent, subdeciduous; pedicels 5 to 7 mm. long, soft pubescent, subrecurved, yellowish green flowers slightly odorous, pendulous; calyx creamy white, the 5

segments nearly free and strigosely hairy on the outer side, lanceolate, 6 mm. long, 1.75 mm. wide below the middle or toward the base, glabrous on the upper side, in the dry state brown with yellowish margins, subpersistent; petals pure white, free, equal in number and length, densely hairy on the back, finely strigose or subglabrous on the inner side, cuneate in outline, usually 3-lobed nearly to the middle, each of the divisions segmented into 2 or 3 curved and twisted glabrous lacinae, subhyaline and 3-nerved, 2 mm. wide across the middle, the sides of the cuneate base usually rolled upon the upper side, set in between the glands which are yellow, conspicuous, finely and softly pubescent and usually shallowly grooved along the dorsal line; stamens about 20, erect, crowded and inserted upon the ovary ring of glands; filaments yellowish, finely scabrous, 1 mm. long, occasionally forked; subterete; anthers similarly colored except the greenish tips, linearly oblong, 2 mm. long, scaberulous, angularly terete, split at the apex which bears ciliate hairs or bristles, dehiscing apically; pistil 7.5 mm. long; ovary short, ovoid, densely hairy, whitish; style terete, fleshy, hairy below the middle of the same color, bearing a minute greenish stigma; fruits 2.5 cm. long, 1 to 1.5 cm. thick across the middle, subpyriform or fusiform, irregularly terete, green, hard, containing a comparatively small sharply pointed and shallowly rugose stony seed; pericarp thick, with maturity aerugineous; main stalks occasionally branched.

Type specimens 10819 for flower and 11769 for fruit, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, June and September respectively, 1909; also number 10828 from the same locality.

The flowering type was collected on a high open knoll covered with bamboos and light woods at 3750 feet south of the Baruring river; the fruiting type was collected on very steep or nearly precipitous slopes of the Sibulan river at 3000 feet altitude. Number 11769 the Bagobos call "Marintok" the other two numbers "Lanauti".

Number 10828 apparently has larger flowers than the type number, and is also more pubescent. Closely related to *E. procerus* Aug. DC. but leaves longer, less numerously crowded and much slenderer pointed toward the apex. Our flowers are smaller and their bracts are in proportion. The fruits of *Aug. de Candolle's* species are not known.

***Elaeocarpus nervosus* Elm. n. sp.**

A large tree; trunk 20 m. high, thicker than 1 m., terete; branches mainly at the top and spreading, the ultimate ones lenticelled, rather crooked yet slender; branches comparatively thick, yellow on the inner side; wood moderately soft, white with a slight yellow tinge, light, without odor or taste. Leaves chartaceous, deeply conduplicate on the upper dark green and shining surface, duller and lighter green beneath, grayish brown when dry, alternating along the branchlets, quite variable in size, glabrous, elliptic or ovately elliptic, the larger blades 1 dm. long, 5.5 cm. wide across the middle or immediately below it, entire toward the broadly rounded base which is obtuse in the smaller leaves, apex obtuse or acute, otherwise crenately serrate but very shallowly so; midvein prominently raised beneath, reddish brown in the dry state; lateral nerves very conspicuous from beneath, glabrous, similar in color, ascendingly curved, their ends coarsely anastomosing, 5 to 7 on a side, reticulations very obscure; petiole reddish green, varying from 1 cm. long on the smaller leaves to 3 cm. long for the larger ones, terete, glabrous, rather stout. Inflorescence mainly along the twigs below the foliage, profuse; spikes 0.5 to 1.5 dm. or occasionally 2.5 dm. long, angularly striate, puberulent, flexible, ultimately glabrous, divaricate; pedicel 1 cm. long, rather stout, puberulent; calyx thick and rigid, 5, puberulent, ovately oblong, 7 mm. long by 3 mm. wide below the middle, dull red; petals below the glands creamy white, 6 mm. long, 5 mm. wide above the middle, cuneate at the base, fan-like, the linear lacinae numerous and extending to below the middle, finely ciliate along the margins below the middle, numerous nerved, thick and rigid at the base, 5, caducous; the hypogynous rim boldly and roundly 5-lobed, glabrous; stamens yellowish gray, toward 30; filaments subglabrous, relatively slender, 1 mm. long, usually with a single or double bend; anther 2 mm. long, 0.5 mm. thick, also subglabrous, obscurely flattened and grooved on the sides, terminated by 2 short and blunt equal lips, dehiscing terminally; ovary flatly conical, subscabrous, terminated into a very short point or style. Fruit hard, ellipsoid, 2 cm. long, 1.5 cm. thick across the middle, pleasing deep red, the stone seed with shallow convolutions.

Type specimens 11566<sup>7</sup> for flower and 10802 for fruit, A. D. E. Elmer, Todaya (Mt. Apo), District of Davao, Mindanao, May and August respectively, 1909.

The flowering type was discovered in the dense mossy forested basin at 5250 feet along the Mararag creek of Apo; the fruiting specimens were gathered on a forested ridge at 500 feet lower altitude of mount Calelan. The former was called "Onas," the latter "Caleso" by the natives or Bagobos.

*E. cumingii* Turcz. is its nearest ally, but the leaves have a different cut and nerves much more pronounced than in *Cuming* 807.

***Elaeocarpus gitingensis* Elm. n. sp.**

A middle sized tree; stem 13 m. high. 4.5 dm. thick, its main branches arising from below the middle; wood burly and whitish at least on the outside, odorless, tasteless; bark thick, yellowish on the inner side, grayish and smooth on the epidermis; branches numerous, lax, widely spreading, the glabrous and ultimate ones suberect. Leaves alternate, glabrous, submembranous, recurved especially toward the acuminate apex, somewhat folded upon the upper darker green surface, copious, drying dull brown, margins wavy and finely dull serrate especially above the middle, lanceolate to oblongish, base acute to obtuse, the larger blades nearly 7.5 cm. long by fully 2 cm. wide across the middle; petiole very slender, glabrate, 1.5 to 2 cm. long; midvein conspicuous, with fine grayish hairs along its sides in the early state; lateral nerves 5 to 7 on a side, much ascending, only slightly curved, not conspicuous nor reticulations evident. Inflorescence spicate, ascendingly spreading, mostly from the uppermost leaf axils, the stalks green and covered with a cinereous pubescence, ultimately nearly glabrous, 5 to 8 cm. long; flowers odorous, pendulous, creamy white; pedicels cinereous subrecurved, ultimately glabrous, slender, 6 mm. long; calyx united at the cup shaped base, otherwise erect, also minutely cinereous, segments 5, lanceolately oblong, 5 mm. long by 1.5 mm. wide across the base, whitish margins puberulent; creamy white petals free, caducous, fully as long as the sepals, oblongish in outline, light creamy yellow, cinereous below the middle on the back, bright or silvery white hairy, canescent on the middle region of the inner side, the apical one half divided into 5 to 7 glabrous laciniate

segments; ovary glandular, rim deep yellow, with short silvery hairs; stamens 15, erect, crowded upon the ovary disk; filament 1 mm. long, finely strigose, subcompressed; anthers brownish, 2.5 mm. long, 0.5 mm. thick, lobular, quadrangular, hispidulous, terminating into 2 unequal lips, dehiscing terminally; ovary covered with dense silvery hairs, otherwise greenish; style slender, 5 mm. long, subglabrous, the greenish stigma minute; fruits less than 1.25 cm. long, nearly 7.5 mm. thick across the middle, shining deep dull green, ellipsoid.

Type specimens 12050<sup>a</sup> for flower and 12470 for fruit, *A. D. E. Elmer*, Magallanes (Mt. Giting-giting), Province of Capiz, Sibuyan, March and May respectively, 1910.

In compact soil of woods along the Pauala river or on hills at 750 feet.

Quite similar to *E. curranii* Merr. yet very different specifically.

***Elaeocarpus versicolor* Elm. n. sp.**

Large widely spreading tree; stem 1.33 m. thick, 20 m. high, terete and somewhat crooked; wood soft, yellowish white, light, odorless and without taste; bark gray, densely covered with lenticels or excrescences, 1.25 cm. thick, yellowish on the inner surface; main branches arising from above the middle, the ultimate ones glabrous and quite numerous, thereby forming bushes. Leaves very smooth on both sides, glabrous at all times, much deeper green on the upper conduplicate side, alternate, not numerous, mostly toward the ends of the twigs, ovately elliptic, curing dull green, the average blades 1 dm. long by 5.5 cm. wide below the middle, apex acute or obtuse, subentire toward the obtuse or obtusely rounded base, otherwise crenately serrate; midvein quite prominent beneath, reddish brown when dry; lateral ones 5 to 7 pairs, ascendingly curved, their tips anastomosing, all smooth and glabrous, articulations obscure; petioles subterete, glabrous, 2 to 3 cm. long, a trifle thickened at both ends. Spikes divaricately spreading from the branchlets below the foliage, profuse, 1 to 1.5 dm. long or less, strict, stout, glabrous or in the younger state pulverulent, terete, striate; pedicels very similar, divaricately recurved, 1 cm. long; fruits alternately scattered, mainly above the middle, 2.5 cm. long, at least 1 cm. thick across the middle, terete, bluntly ellip-

soid or elongate in outline, smooth, hard and luteus, but soon after falling becoming soft and turn nearly ruber red; stone seed large and rugose.

Type specimen 12761, A. D. E. Elmer, Puerto Princesa (Mt. Pulgar), Palawan, March, 1911.

Collected in a densely forested humid flat at 500 feet altitude along the Iwahig river.

Not *E. multiflorus* Turcz. by fruits; neither is it *E. oblongatus* Gaertn.

**Elaeocarpus fulvus** Elm. n. sp.

Lofty tree; stem 6 dm. thick, 20 m. high or higher, terete, not straight; main branches comparatively short, crookedly spreading, the twigs floccosely fulvus which soon wears off; wood soft, yellowish white, odorless and tasteless, easily chopping; bark smoothish, brown, gray on the larger branches. Leaves submembranous, deeply conduplicate on the upper dark green surface, recurved toward the obtuse apex, lighter green beneath, drying brown, alternately crowded toward the ends of the twigs, mostly ascending, oblong, entire toward the obtuse or acute base, otherwise with fine serratures, glabrous when old, blades 1.25 dm. long by 4 cm. wide across the middle, young leaves densely fulvous covered on both sides; midvein conspicuous and reddish brown beneath; lateral ones 9 to 12 on a side, relatively conspicuous, divaricate or oblique, tips anastomosing, reticulations fine and quite evident from both sides; petiole fulvous felt covered, when old glabrate, 1 to 2 cm. long, flattened along the upper side. Inflorescence sparse, axillary or more frequently from the twigs beneath the foliage; spikes less than 5 cm. long, slender, in the early state densely clothed with soft short fulvous hairs; flowers pendulous, odorless, greenish, deciduous; pedicels very slender, 1 cm. long, slightly hairy toward the base; calyx rounded and united at the very base, glabrous on the inner side, on the outer side with crinkled fulvous hairs and with age becoming subglabrous, the midvein conspicuous especially on the inner side, oblong from the base, 5 mm. long, nearly 2 mm. wide below the middle, nerves apparent, obtuse at apex; petals free, deciduous, oblong in outline, 7 mm. long, 3.5 mm. wide across the middle, yellowish white, strongly nerved,

glabrous except for the woolly crinkled hairs along the margin below the middle, the upper one third laciniately dissected; ovary disk rugulose, yellow, densely pubescent, prominent; stamens at least 20, crowded about the ovary and inserted upon the rim; filaments 0.75 mm. long, finely hairy on the outer or exposed side, subterete; anther linear, fluted, 2.5 mm. long, scaberulous, 0.5 mm. thick, unequally 2-lipped at the apex, dehiscing terminally; ovary short conical, hairy; style fleshy, terete, glabrous, pale white, stigma united.

Type specimen 10825, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, June, 1909.

Collected on gentle slopes of dense forests at 3750 feet of mount Calelan. This rare and big tree species the Bagobos call also "Lanauti."

Evidently related to *E. cumingii* Turcz. and with it resembling *E. verruculosum* Aug. DC.

### ***Elaeocarpus burebidensis* Elm. n. sp.**

A rather large tree; stem 6 dm. thick, 15 m. high, its main branches mainly toward the top and spreading; wood whitish, odorless and tasteless, moderately soft; bark roughened with blunt lenticels, gray and brown mottled; branchlets ascending, quite rigid, the young striate twigs covered with dull fulvous hairs. Leaves alternately scattered along the twigs, more or less ascending, rigidly chartaceous, flat or only the blunt obtuse to acute apex recurved, slightly shallowly folded upon the upper very dark green and sublucid surface, much paler and duller beneath, curing dull brown, margins coarsely and serrately dentate, the entire base acute to subcuneate, oblongish, with the widest portion usually above the middle, the blades 1 dm. long by 3.25 cm. wide across the middle or a trifle above it, when old glabrous on both sides, midvein pronounced beneath, finely hairy along its sides in the early state; lateral nerves 6 to 10 on each side, oblique, straight, not at all prominent, the fine reticulations very evident from both sides; stout petioles 1 cm. long or longer, soft fulvous pubescent when young, flattish on the upper side, ultimately glabrate. Inflorescent spikes ascending, yellowish green and covered with an isabellinus tomentum, stout, 3 to 7 cm. long, not numerous

from the leaf axils; flowers scattered, sparse, pendulous or nearly so, creamy yellow; pedicels yellowish green, recurved, rather stout, densely pubescent; calyx deep yellow, 10 mm. long, 3.5 mm. wide toward the base, thick, short, hairy on both sides, free, the basal portion cup shaped, the upper portion free and erect, broadly lanceolate, the inner side with a midvein; petals inserted below the disk, paler yellow, 5 or as many as there are sepals, 10 mm. long, nearly 5 mm. wide across the middle, quite thick toward the base, subpandurate, free, deciduous, densely hairy on both sides, provided on the ventral side with a thick midvein, oblongish in outline, the upper lateral and apical portion regularly divided into many linear glabrous segments 2 mm. in length, the margins in the dry state strongly rolled upon the upper side; ovary disk rugose, hairy, yellow; stamens 15, inserted upon the ovary disk; filaments subterete, finely hairy or scabrous, 2 mm. long, a trifle constricted at the distal end; anthers 3 mm. long, linear, finely scabrous, obscurely 4-angled, split at the apex into 2 unequal lips, 0.5 mm. thick, dehiscing apically; ovary short ovoid, hairy, whitish; style of the same color, terete, fleshy, gradually tapering toward the minute greenish stigma, 7.5 mm. long.

Type specimen 11837, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, September, 1909.

Only one tree of this elegant species was found on the wooded or forested ridge at 4000 feet of mount Burebid.

***Elaeocarpus verticellatus* Elm. n. sp.**

A medium sized tree; stem 10 m. high, 4.5 dm. thick, its main branches from the middle or above it; wood whitish, moderately soft, odorless, with a slight bitter taste; bark brown, smoothish; limbs widely spreading, freely rebranched; twigs lax, terete, ascendingly curved, usually arranged in subwhorls (the central terminal one short, the lateral one or two longer), terete, smooth and glabrous. Leaves terminally crowded and appearing as in subwhorls, subchartaceous, glabrous, ascending or horizontally spreading, shallowly folded upon the dull green upper side, the blunt acute apex usually recurved, a trifle paler beneath, deciduous, obovate to broadly oblanceolate, 1 dm. long including the petiole, slenderly cuneate toward the base, greenish brown in the dry state, 3 cm. wide

above the middle, entire or only occasionally with a minute serrature; midvein dark brown especially toward the base, with about 5 lateral nerves on either side; nerves with glabrous glands in their axils, less prominent, oblique, their ascending tips coarsely anastomosing, reticulations very coarse and scarcely evident; petiole 7.5 mm. long, blackish brown, grooved along the upper side. Inflorescence immediately beneath the foliage in subwhorls, profuse; spike slender, glabrous, 5 to 8 cm. long, usually curved; flowers pendulous, slightly fragrant, deciduous, chiefly toward the distal end of the rachises; pedicels very slender, glabrous, 2 cm. long, gracefully curved; sepals free, caducous, lucid white, dull yellowish when dry, 4, ovately oblong, 8 mm. long by nearly one half as wide near the base, apex very blunt, glabrous; petals similar in color and number, subpandurate toward the base, 6 mm. long, 4 mm. wide above the middle, the basal united portion and margins woolly pubescent especially along the prominent midvein in the concavity, otherwise glabrous, coarsely veiny, the broadly rounded apical portion terminated by 5 to 7 roundish teeth; disk irregularly rugose, finely hairy; stamens erect, 20, yellowish brown; filaments 2.5 mm. long, glabrous except toward the finely or sparsely ciliate distal end, thickened toward the base; anther as long, fluted, 0.33 mm. thick, terminated by 2 unequal lips, dehiscing through the terminal slit, linear, subglabrous; ovary ellipsoid, glabrous, one third as long as the style which is 5 mm. long, slender and glabrous. Fruit bluntly ellipsoid, 1.5 cm. long, 1 cm. thick across the middle, coeruleus when ripe, very smooth and shining, its stony seed shallowly rugose.

Type specimens 12104 for flower and 12427 for fruit, A. D. E. Elmer, Magallanes (Mt. Giting-giting), Province of Capiz, Sibuyan, March and May respectively, 1910.

This very characteristic species was commonly seen along the Pauala river from 750 to 1500 feet, being more numerous at the higher altitude. In no other Philippine species are the branches, leaves and spikes verticellately arranged and in no other species do the floral parts fall so early and so easily. "Karot" is the Visayan name.

***Elaeocarpus gigantifolius* Elm. n. sp.**

Large tree; stem over 1 m. thick and 20 m. high, not strict-

ly terete, buttressed at the base; branches mainly toward the top, crookedly rebranched and widely spreading, the ultimate ones rather slender and more or less hanging; twigs suberect, green, angular, lenticelled, glabrous, 1 to 2 cm. thick; wood light and soft, odorless, tasteless, yellowish or silvery white; bark yellowish gray, smoothish. Leaves glabrous, dull brown in the dry state, alternately scattered, lighter green beneath, sublucid above, shallowly conduplicate and slightly recurved, elliptic or ovately so, obtuse at the apex, broadly rounded at the base, subentire or with coarse crenate serratures, 3 dm. long, 2 dm. wide across the middle or immediately below this, occasionally much smaller or much larger; midvein yellowish green, very stout and prominent beneath, rather sharply edged; lateral nerves 9 to 13 pairs, subdivaricate, nearly parallel, less prominent, their tips usually forked and reticulately united, cross bars rather fine; petiole stout, 1 dm. long, 5 mm. thick, also glabrous, triangular in shape, flattish grooved along the upper side, a trifle curved, 1.5 dm. long, yellowish pulverulent, irregularly striate from the leaf axils mostly; pedicels relatively stout, 5 to 7.5 mm. long, glabrous; calyx squarely cup shaped, only a trifle united about the base, also glabrous, 6.5 mm. long by 3.5 mm. wide across the base, ovately oblong, quite thick, midvein more or less conspicuous on the upper side, 5, green; petals yellowish green, caducous, from below the disk, free, clawed toward the cinereous base, otherwise glabrous, widely and cuneately spreading, 5 mm. long, only 1 or 2 mm. narrower above the middle, divided to the middle into 5 to 7 segments each of which further up are again dissected into 2 to 3 fimbriate lacinae which are of a deeper yellow or brownish; hypogenous rim very large, roundly lobulate, subglabrous; stamens 40, erect, densely crowded upon the disk, yellowish; ovary short ellipsoid, subglabrous or velvety; style 1.5 mm. long, glabrous, rigid, pointed; fruit purpureus, upon 1 to 3 dm. long spikes of the branchlets below the foliage, scattered, their pedicels 1.5 cm. long, smooth, 2.5 cm. long, 1.25 cm. thick across the middle, ellipsoid or obscurely obovate ellipsoid; meat nearly yellow; stone shallowly grooved or scalloped.

Type specimen 11184, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, July, 1909.

This magnificent large leafed species was discovered on a

very steep densely wooded embankment near a perpendicular stream cut on the overland trail along the Sibulan river at 2500 feet. The vernacular Bagobo name is "Nabol."

***Elaeocarpus candollei* Elm. n. sp.**

A small or middle sized tree; stem nearly 3 dm. thick, 10 m. high, terete; main branches from above the middle, suberect, ultimately numerously branched; the glabrous twigs suberect, less than 5 mm. thick; wood rather soft, dingy or yellowish white, light, odorless and tasteless; bark relatively thick, gray, roughened with lenticels, otherwise melleus especially the inner side. Leaves terminally clustered, ascending, coriaceous, folded upon the upper very deep green surface, much lighter on the nether side, the obtuse to acute apex recurved, glabrous, alternate, greenish brown in the dry state, the average blade 1 dm. long by 5 cm. wide across the middle, elliptic to oblongish, entire toward the obtuse base, otherwise usually with shallow crenate serratures; midvein very pronounced beneath, reddish brown, shining; lateral pairs 5 to 7 on each side, very oblique, subparallel, tips anastomosing, also conspicuous, with minute glands in their axils, reticulations very fine and especially evident from the upper side; petiole glabrous, 3 cm. long, reddish brown thickened at both ends, caniculate along the upper side. Spicate inflorescence slightly striate, slender, more or less 1 dm. long, arising from the lowermost leaf axils; flowers pendant, odorless, their buds obovoidly elongated; pedicels stramineus, recurved, light ashy gray pubescent, at most 7.5 mm. long; calyx densely canescent on the outside, united about the base; segments 5, glabrous on the inner side and with a conspicuous midvein, 7 mm. long, nearly 2 mm. wide toward the base, lanceolately oblong, with blunt apices; petals veiny, equal in number and in length, oblong in outline, cinereous on both sides, the midvein on the upper side toward the base very prominent, inserted below the glands which snugly fit in between the margins and the midvein, 2.5 mm. wide, the upper one third pectinate and glabrous; glandular or hypogenous disk flavus, subglabrous or only sparsely strigose, large, cognately lobed; stamens 20, inserted upon the rim, straight, erect; filaments 1 to 2 mm. long, usually curved, finely hispid, subterete; anther 0.25 mm. thick, linear,

scarcely thicker than the filaments, longitudinally grooved, 3 mm. long, subscabrous, terminated by 2 very unequal lips, straight, pollen disseminating through the terminal slit; pistil green, glabrous, the ovary ellipsoid, the terete style slender and 5 mm. long, stigma very minute.

Type specimen 12974, A. D. E. Elmer, Puerto Princesa (Mt. Pulgar), Palawan, April, 1911.

Discovered in shallow humus covered and well drained soil of a slightly wooded ridge at 1250 feet altitude.

This species has close affinity to *E. elmeri* Aug. DC., but our flowers are larger, their parts different in shape and pistil entirely glabrous, not silky pubescent. Dedicated to Dr. Aug. de Candolle.

***Elaeocarpus apoensis* Elm. n. sp.**

A tall tree; stem 20 m. high, 4 dm. thick, straight; limbs rigid, crooked and gnarly, the ultimate ones relatively short; wood moderately hard, not brittle, yellowish white throughout, odorless and tasteless; bark smooth, brown, that on the branches gray, the young twigs fulvous puberulent but soon becoming glabrate. Leaves chartaceous, alternate, mostly toward the end of the twigs, few, dark green above, much duller beneath, brown when dry, nearly flat, margins wavy, with widely scattering crenate serratures, apex abruptly acute or merely obtuse, base obtusely to broadly rounded, blades oblongish, the larger ones 15 cm. long, 6 cm. wide across the middle, frequently much smaller, glabrous above, puberulous on the nether side especially when young; midvein pronounced, also puberulous; lateral nerves varying with the larger or smaller blades from 4 to 8 on each side, ascendingly curved, occasionally branched from or above the middle, reticulations very fine and equally evident from both sides; the longer petioles 3 cm., becoming glabrate, subcompressed. Spikes stout and rigid, subterminal at the ends of the second year old twigs, divaricate, 5 cm. long or less, densely clothed with soft fulvous hairs, more or less striate; buds ovoidly ellipsoid, pendant, fulvous brown tomentose, with 5 yellowish brown costae; flowers pendant, possess a sourish fruit odor; pedicels 1.5 cm. long, thick, recurved, short and densely brown pubescent; sepals 5, caducous, very thick, the

dorsal side covered with a felt-like ferrugineous covering, 1.5 cm. long, nearly 5 mm. wide toward the base, lanceolately oblong, valvate, glabrous and red on the inner side, deeper red toward the apex and more glabrous toward the base; petals 5, also caducous, nearly 2 cm. long, subpandurate in outline, very thick, glabrous and with a strong midvein on the ventral surface, flesh red, strigosely hairy on the back, the upper lateral sides and apical portion cut up into glabrous filiform segments 3 to 5 mm. in length, 7.5 mm. wide at or above the middle; ovary disk large or thick, lobulately rugose, hairy; stamens erect, curvingly crowded about the ovary, inserted upon the disk, nearly 150, dull ashy brown; filament almost 2 mm. long, subteret, provided with ciliate hairs on the exposed portion; anthers subterete or fluted, 5 mm. long, fully 0.5 mm. thick, glabrous except for the ciliate hairs along the back or exposed portions, linearly pointed at the 2-lipped apex, the upper lip much longer, dehiscing through the terminal slit; pistil 10 mm. long; the hairy ovary subellipsoid; style terete, gradually tapering to the minute green apex, thinly set with hairs; fruit globose, dark green, hard, with dark or wine colored meat, fully 2.5 cm. in diameter and dark aerugineous in color when mature, the stony seed rugose.

Type specimen 10524, A. D. E. Elmer, Todaya (Mt. Apo), District of Davao, Mindanao, May, 1909.

This rare species was discovered in fertile humus covered soil of a dense forested flat at 4250 feet along the trail to Baclayan. "Tapaok" is the Bagobo name.

Resembling yet very different from *E. octopetala* Merr.

### ***Elaeocarpus laxirameus* Elm. n. sp.**

Tree; stem 45 dm. thick, 12 m. high or higher; branches mostly toward the top, widely spreading and crookedly rebranched, the ultimate ones very numerous and fine; twigs lax, green, suberect or curvingly drooping, glabrous, the young portion fluted; wood soft, yellowish white, odorless, with a distinct bitter taste; bark smoothish, brown, reddish beneath the epidermis, yellow on the inner side. Leaves copious, alternately scattered along the twigs, submembranous, ascending but the acuminate apex recurved, shining deep green on the upper folded side, paler beneath, drying pale brown, the

young ones canescent but soon becoming glabrous, base acute to subcuneate and entire, otherwise the margins are finely set with crenate serratures, elliptic or elliptic oblongish, the smaller ones lanceolate, the average blades 3 cm. long by 1.5 cm. wide across the middle; midvein quite conspicuous, reddish brown; lateral nerves 5 to 7 pairs, yellowish brown, much less conspicuous, ascendingly curved, tips reticulately united, with minute axillary glands, reticulations exceedingly fine and evident from both sides; petiole less than 1 cm. long, slender, glabrous, grooved along the upper side. Inflorescent spike arising from the terminal or sub-terminal leaf axils, sparse, 3 to 5 cm. long, slender, usually curved, dull silvery white pubescent; flowers pendulous, creamy white, odorless; pedicels very slender, 5 mm. long, densely grayish white pubescent; calyx nearly free or only slightly united about the base, canescent on the back, subglabrous on the central side and with a midrib, quite thick, lanceolately oblong, 4.5 mm. long, nearly 2 mm. wide below the middle, only 4; petals also only 4, a trifle longer than the sepals with which they alternate, puberulent especially along the margins, 3 mm. wide above the middle, cuneate toward the base, the apical one third dissected into 5 to 8 linear segments, from below the disk, veiny; hypogenous disk very pronounced, densely canescent, rugose, yellowish; anthers erect from the upper side of the rim; filaments averaging 0.5 mm. long, subglabrous; anther 1.5 mm. long, subterete, grooved and ridged longitudinally, subglabrous, toward 20 in a flower, very unequally 2-lipped at apex, dehiscing terminally; ovary conical, canescent or pubescent, the gradually tapering 2 mm. long style hairy at the base, otherwise glabrous. Infrutescent spikes glabrous, striate, rarely branched, slender, the 1 cm. long pedicel similar; fruits 9 mm. long by 6 mm. thick across the middle, ellipsoid or ovoidly so, smooth, hard, dark green in the young state, the older ones aerugineous green; its meat reddish, juicy and tightly adhering to the stony nearly smooth seed.

Type specimens 11945 for flower and 11222 for fruit, A. D. E. Elmer, Todaya (Mt. Apo), District of Davao, Mindanao, October and July respectively, 1909.

Of this laxly branched and finely leafed species only one tree was found on the wooded summit ridge of mount Burebid at 3750 feet. For both the fruiting specimen and for the flowering

specimen collected a few months later from the same tree, the natives gave me their Bagobo name as "Balintodog."

***Elaeocarpus baclayanensis* Elm. n. sp.**

A large lofty forest tree; trunk 30 m. high, 1.35 m. thick 3 m. from the ground, straight and round, at the base buttressed; its main branches chiefly toward the top, spreading, crookedly rebranched, the branchlets numerous and quite lax; twigs less than 5 mm. thick, the young portion yellowish gray pubescent, usually ascendingly curved, relatively short; wood soft, light, silvery or maple white, toward the central mass yellowish tinged, fine for working purposes; bark smoothish, brown, thick. Leaves submembranous, similarly dull green on both sides, alternately clustered toward the ends of the twigs, folded above, tips slightly recurved, curing unequally dull brown, copious, oblongish, the upper side nearly glabrous except the midvein, beneath thinly pubescent, obtuse to acute at apex, base acute to subcuneate, entire below the middle, otherwise with fine crenate serratures, the average blades 8 cm. long by 3 cm. wide across the middle, frequently larger or smaller; midvein prominent beneath, canescent, finally glabrate; lateral ones much less conspicuous, 7 to 10 on each side of the midvein, oblique, forked at their ends and reticulately united, reticulations obscure, with large hairy glands in the axils of the nerves; petiole 1.5 cm. long, hairy matted along the upper flat or grooved side, otherwise becoming subglabrate. Buds ovoidly oblong, densely silky strigose, 5 mm. long; segments 5, lanceolately oblong, also appressed hairy on the inner side which has a prominent midvein, barely united at the base; petals also 5, pale white, at least as long as the sepals, oblong in outline, laciniately divided into 5 to 7 glabrous segments, the dorsal side up to the segments densely covered with silky hairs, otherwise nearly glabrous; stamens upon 1 mm. long filaments, crowded about the pistil, about 35 in number; anthers longer, also linear, minutely cleft at the apex which bears a tuft of minute hairs; ovary hairy; style rather thick, becoming gradually thinner toward the small stigma. Fruit globose like a marble, 2 cm. in diameter, dark green, glabrous even in the young state, its spikes and pedicels also glabrous, stout, ligneous.

Type specimens 10734 for flower and 11946 for fruit, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, May and October respectively, 1909; also numbers 11712 and 11414 from this same locality.

This like most all tree species in the rich, moist and sheltered mount Apo basin attains to an enormous size. It is universally known to the Bogobos as "Lanauti" although my field labels for the last numbers cited give the vernacular name as "Magsangod".

Our young inflorescence is much more densely covered with yellowish gray wool than *E. subglobosus* Merr. from Benguet province of northern Luzon.

***Elaeocarpus microphyllus* Elm. n. sp.**

A rather large tree; stem 7.5 dm. thick, 15 m. high or higher; branches crookedly spreading from the middle, ultimately numerously branched, the glabrous and greenish twigs usually in small groups from the same point; wood moderately hard, more or less burly, white or with a slight yellow tinge, odorless and tasteless; bark smoothish or lenticelled, yellowish brown and gray mottled, rather thick, yellow on the inner side. Leaves descending, folded upon the upper darker green surface, subchartaceous, copious, alternately crowded at the ends of the seasonal growths, dull greenish brown when dry, the slender acuminate or subcaudate tips recurved, glabrous, obtusely rounded at the base, entire, larger blades 7 cm. long by 2 cm. wide a trifle below the middle, frequently much smaller, lanceolate or ovately oblong, margins wavy and entire or with only a few minute serratures above the middle; midvein conspicuous beneath, deep brown, smooth and shining; lateral nerves about 6 pairs, obscure, ascending, reticulately united, reculations very minute and equally visible from both sides; petioles also glabrous, slender, nearly 2 cm. long. Inflorescence apparently young, profuse along the branchlets below the foliage; spikes 3 to 7 cm. long, green and glabrous, divaricate; pedicels similarly arranged, mostly above the middle, less than 1 cm. long, terminated by a yellowish green rugose thickening; fruits ellipsoid, not exceeding 1.5 cm. in length, shining dark green with lighter green spots, about 0.75 cm. across the middle.

Type specimen 11860, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, September, 1909.

In rich moist humus covered soil of dense forests at 4500 feet of mount Calelan. The Bagobos know it as "Magaring."

A segregate of *E. pendula* Merr., because of its large tree size, numerous branchlets, copious leaves which are less than one half as large and not broadly rounded at the base and whose petioles are shorter. Our young fruits apparently develop to larger size and the flowers of this species are unknown. Number 11404 from this same locality is *Merrill's* species.